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(71) Applicant: PHILIP MORRIS INCORPORATED
120 Park Avenue
New York, New York 10017(US)

(72) Inventor: Houck, Willie Gray, Jr.
7753 Lake Forest Drive
Richmond Virginia 23235(US)

(72) Inventor: Nichols, Walter Allen
10316 Edgebrook Court
Richmond Virginia 23225(US)

(72) Inventor: Newsome, Reginald Wayne
216 Philray Road
Richmond Virginia 23236(US)

(74) Representative: Bass, John Henton et al,
REDDIE & GROSE 16 Theobalds Road
London WC1X 8PL(GB)

(54) Filter cigarette.

(57) A filter cigarette is provided which is adjustable to provide a wide range of air dilution and/or resistance to draw values and which comprises a tobacco rod 1, a substantially cylindrical filter plug and substantially air impermeable tipping paper 11. The filter plug comprises a first, mouth-end segment 7 and a second, axially aligned, rod-end segment 3 spaced apart from the first segment. The wrapping, which is substantially air impereable, circumscribes the first and second segments defining a substantially cylindrical void 8 therebetween which may include means for releasing varying amounts of a flavourant. The first segment is movable towards the second segment thereby compressing the plug wrap between the segments which decreases the volume of the void and increases the resistance to draw value of the cigarette. Variable air dilution may be achieved by providing at least one opening 17 in the tipping paper and at least one opening 19 in the underlying plug wrap positioned such that, as the first segment is moved axially towards the second segment, the first and second openings are moved into varying degrees of registry thereby emitting varying amounts of air to the filter.

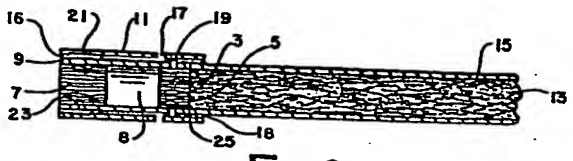

Fig. 3

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FILTER CIGARETTE

The present invention relates to filter cigarettes. More particularly, the present invention relates to filter cigarettes which are adjustable.

Various mechanisms have been disclosed in heretofore issued patents which provide for adjustment of the air dilution value of a filter cigarette, but these mechanisms are not without certain disadvantages. While many complicated mechanisms have been disclosed, the simpler mechanisms generally involve making one or more openings through a substantially air impermeable filter plug wrap and the overlying, substantially air impermeable tipping paper and one or more corresponding openings in a sleeve which is placed over the tipping paper and which is then either rotated or moved axially to select the degree to which the two sets of openings are in registry. In another embodiment found in the art, the filter is not glued to the tipping paper and thus may be moved axially within the cylinder formed by the tipping paper. Openings are made in the filter plug wrap and corresponding openings are made in the tipping paper. The air dilution value is adjusted by axially moving the filter plug within the tipping paper to adjust the degree to which the two sets of openings are in registry.

Among the problems associated with such mechanisms are that the sleeve or filter plug may be removed from the cigarette by the smoker and not readily replaced, and that when dilution is desired, thus requiring some degree of registry between the two sets of openings, this registry may be inadvertently destroyed by a slight axial movement of the sleeve or plug. Accordingly, the dilution, once set by the smoker, is not ensured of any degree of consistency. Yet another problem associated with a number of these

prior devices is that they have not been readily adaptable to a high rate of production on cigarette making machinery of conventional design.

Accordingly, it is an object of the present invention to provide a cigarette which can be readily manufactured on conventional cigarette making equipment and that is adjustable to vary the ratio of air to smoke delivered to the mouth of the smoker.

According to the invention, there is provided a filter cigarette comprising a tobacco rod, a wrapped, substantially cylindrical, filter plug characterised in that the filter comprises: a first mouth-end segment and a second axially aligned, rod-end segment spaced apart from the first segment; means joining the tobacco rod to the second segment in axially aligned, abutting end-to-end relation; and substantially air impermeable tipping paper, further characterised in that the wrapping is substantially air impermeable and defines a substantially cylindrical void between the first segment and the second segment, and in that the tipping paper circumscribes the filter plug and the mouth end of the tobacco rod, the first segment being movable along the longitudinal axis of the cigarette towards the second segment, whereby the plug wrap between the first segment and the second segment is compressed, thereby varying the resistance-to-draw of the cigarette.

Cigarettes of the invention are adjustable to provide a wide range of air dilution and/or resistance-to-draw values and may include means for releasing varying amounts of a flavourant. The air dilution value is the ratio of the volume of air to the volume of smoke exiting the mouth end of the filter, expressed as a percentage.

There may also be provided at least one opening in the tipping paper and at least one opening in the

underlying plug wrap positioned such that as the first segment is moved axially towards the second segment, the first and second openings are moved into varying degrees of registry, thereby admitting varying amounts of air to the filter, changing the air dilution value of the cigarette.

The invention will now be further described, by way of example, with reference to the drawings, in which:

Fig. 1 is an enlarged, partially fragmentary perspetive view, taken from the mouth end, of a first preferred embodiment of the filter cigarette of the present invention;

Fig. 2 is an enlarged perspective view, taken from the mouth end, of the assembled embodiment of Fig. 1;

Fig. 3 is a cross-sectional view taken along the line A-A of Fig. 2;

Fig. 4 is an enlarged, partially fragmentary perspective view, taken from the mouth end, of a second preferred embodiment of the filter cigarette of the present invention;

Fig. 5 is an enlarged perspective view, taken from the mouth end, of the assembled embodiment fo Fig. 4;

Fig. 6 is a cross-sectional view taken along the line B-B of Fig. 5;

Fig. 7 is an enlarged, partially fragmentary perspective view, taken from the mouth end, of a third preferred embodiment of the filter cigarette of the present invention;

Fig. 8 is an enlarged perspective view, taken from the mouth end, of the assembled embodiment of Fig. 7;

Fig. 9 is a cross-sectional view taken along the line C-C of Fig. 8;

Fig. 10 is a view similar to Fig. 9 and showing the first segment moved to a position towards the second segment at which the openings in the tipping paper are in registry with the openings in the plug wrap; and

Fig. 11 is a view similar to Fig. 9 but showing a flavour generator positioned in the void between the first and second segments.

Common to the preferred embodiments of the present invention are the following elements: a tobacco rod 1 comprising a substantially cylindrical charge of tobacco 13 is enclosed in cigarette paper 15 and is axially aligned with a filter plug comprising a first filter segment 7 and a second filter segment 3. Means are provided joining the tobacco rod 1 to the second segment 3 in abutting end-to-end relation at the line of abutment 5. The first and second segments are spaced apart and are joined by a circumscribing wrapping 9 which is substantially air impermeable. This wrapping initially defines a substantially cylindrical void between the first and second segments. The tipping paper 11, which is substantially air impermeable, circumscribes the filter plug and the mouth end of the tobacco rod. The tipping paper extends from a position intermediate the ends of the first segment to a position on the tobacco rod 1 adjacent the rod end of the second segment 3.

A first opening is provided in the tipping paper and a second opening is provided in the underlying plug wrap. The first segment 7 is movable along the longitudinal axis of the cigarette towards the second segment 3 either by rotation or by translation. Movement along this axis compresses the plug wrap between the segments thereby decreasing the volume of the void 8 which varies the resistance to draw to provide a constant resistance to draw value.

The cigarette of the present invention, as shown in Fig. 11, may optionally include a flavour generator 43 in the void 8 which is designed to release increasing amounts of a flavourant within the void responsive to movement of the first segment 7 towards the second segment 3. As a flavour generator, an encapsulation system may be employed, such as strips of cellophane containing discrete reservoirs of one or more flavourants which are designed to burst responsive to the pressure exerted by movement of the first segment towards the second segment. Other equivalent flavour generators which will occur to those skilled in the art may also be employed.

If desired, the first and second openings may be omitted resulting in a filter cigarette which has a variable resistance to draw. This variable resistance to draw embodiment may optionally include a flavour generator.

In a first preferred embodiment shown in Figs. 1 to 3, bands 16 and 18 are interposed between the tipping paper and the plug wrap. Band 16 extends from the mouth end of the first segment 7 up to the rod end of the first segment and is attached to the underlying plug wrap 9. Band 18 extends from a position on the tobaco rod 1 adjacent the rod end of segment 3 up to the mouth end of segment 3. Band 18 is attached to cigarette paper 15 and plug wrap 9 and joins segment 3 to the tobacco rod 1. The tipping paper 11 extends from the mouth end of segment 7 to a position on the tobacco rod 1 which corresponds to the position of the rod end of band 18. At least one opening 17 is provided in the tipping paper and at least one opening 19 is provided through the band 18 and the underlying plug wrap 9. The tipping paper 11 is attached only to band 16 for movement therewith along the axis of the cigarette towards the coal end of tobacco rod 1.

In practice, the smoker moves the tipping paper 11 axially towards the coal end of the tobacco rod 1 which moves segment 7 towards segment 3 compressing the plug wrap between the first and second segments thereby increasing the resistance to draw and varying the degree of registry between the openings 17 and 19 to vary the air dilution value of the cigarette.

The openings 17 and 19 may be made simultaneously through the assembled cigarette to provide an embodiment having, initially, a maximum air dilution value which is decreased by movement of the first segment 7 towards the second segment 3 or the openings 17 and 19 may be made such that they are initially not in any degree of registry such that the cigarette has, initially, a minimum air dilution value which is increased by movement of the first segment 7 towards the second segment 3.

The band 18 joins the tobacco rod 1 to the segment 3, preferably by means of a band of adhesive 25 which overlaps the line of abutment 5. The tipping paper is preferably attached to the underlying band 16 by an adhesive material 21 and the band 16 is preferably attached to the underlying plug wrap 9 by means of an adhesive material 23.

This embodiment, as well as those embodiments discussed below, may be fabricated using existing cigarette making equipment, which is commercially available and known to those skilled in the art, with only minor modifications. The openings in the tipping paper and the underlying layers may be made employing any conventional means such as electrostatic discharge appartus, mechanical perforation appartus, or a laser perforation system. The openings may be made either before or after assembly.

In a second preferred embodiment shown in Figs 4 to 6, the tipping paper 11 extends as in the first

embodiment but is attached directly to the plug wrap 9 over the first segment 7, preferably by means of a band of adhesive material 39. Discrete areas of adhesive material 37 are applied to the inner surface of the tipping paper 11 at positions about the circumference of the inner surface of the tipping paper which overlie the plug wrap intermediate the rod end of segment 7 and the mouth end of segment 3 and define a plane which is perpendicular to the longitudinal axis of the cigarette. A first opening 33 is provided in the tipping paper 11 and a second opening 35 is provided in the plug wrap overlying the segment 3. The openings 33 and 35 are positioned and function to vary the air dilution value as described in connection with the first embodiment.

With one exception, this second embodiment operates as described for the first embodiment and may be modified in the same way as the first embodiment, the exception being that the discrete areas of adhesive material 37 join the tipping paper to the plug wrap 9 such that the rod end of the tipping paper moves towards the mouth end of the cigarette responsive to movement of the first segment 7 towards the second segment 3. In the first embodiment, the entire length of tipping paper 11 moves in the direction of movement of the first segment 7. This movement of the rod end of the tipping paper 11 is caused by compression of the plug wrap 9 overlying the void 8, which compression draws the tipping paper towards the longitudinal axis.

In a third preferred embodiment shown in Figs. 7 to 10, the tipping paper 11 extends from a position intermediate the mouth end and rod end of segment 7 to a position on tobacco rod 1 adjacent the rod end of segment 3. The tipping paper is attached only to the plug wrap overlying segment 3 and to the cigarette paper adjacent the rod end of segment 3, thereby

attaching the tobacco rod 1 to the second segment 3. Preferably, the means of attachment is a band of adhesive 31 which overlaps the line of abutment 5. A first opening 27 is provided in the tipping paper 11 and a second opening 29 is provided in the plug wrap overlying the first segment 7 at a position intermediate the mouth end of the tipping paper 11 and the rod end of segment 7.

In practice, the first segment 7 is moved axially towards the second segment 3 either by a longitudinally acting force which may be applied by holding the cigarette rod and tapping the protruding end of the first segment 7, or by grasping the protruding end and rotating it. This movement compresses the plug wrap 9 which overlies the void 8 as shown in Fig. 10, thereby decreasing the volume of the void 8 and varying the resistance to draw value of the cigarette. This movement also varies the degree of registry of the openings 27 and 29 thereby varying the air dilution value of the cigarette. These openings may be formed and positioned in any of the ways discussed in connection with the first embodiment. The various modifications discussed in connection with the first embodiment are also applicable to the third embodiment.

It will be understood that the particular embodiments described are only illustrative of the principles of the present invention, and that various modifications can be made by those skilled in the art.

CLAIMS

1. A filter cigarette comprising a tobacco rod (1), a wrapped, substantially cylindrical, filter plug characterised in that the filter comprises: a first mouth-end segment (7) and a second axially aligned, rod-end segment (3) spaced apart from the first segment; means joining the tobacco rod to the second segment in axially aligned, abutting end-to-end relation; and substantially air impermeable tipping paper (11), further characterised in that the wrapping (9) is substantially air impermeable and defines a substantially cylindrical void (8) between the first segment and the second segment, and in that the tipping paper circumscribes the filter plug and the mouth end of the tobacco rod, the first segment being movable along the longitudinal axis of the cigarette towards the second segment, whereby the plug wrap between the first segment and the second segment is compressed, thereby varying the resistance-to-draw of the cigarette.

2. A cigarette according to claim 1 further comprising a first contiguous band (16) extending from the mouth end of the filter plug to a position on the first segment (7) adjacent the void (8) and attached to the first segment for movement therewith, the means joining the second segment (3) to the tobacco rod (1) comprising a second contiguous band (19) extending from a position on the tobacco rod adjacent the second segment to a position on the second segment to a position on the second segment adjacent the void, the tipping paper (11) overlying the first and second bands and extending from the mouth end of the filter plug to the second band, the tipping paper being attached to the first band for movement therewith.

3. A cigarette according to claim 1 wherein the tipping paper (11) extends from the mouth end of the first segment (7) to a position on the tobacco rod (1) adjacent the second segment (3), the tipping paper being attached to the first segment and including points of attachment (37) to the wrapping (9) spaced about the circumference of the inner surface of the tipping paper, the points of attachment being disposed intermediate the rod end of the first segment and the mouth end of the second segment.

4. A cigarette according to claim 1 wherein the tipping paper (11) extends from a position intermediate the mouth end and the rod end of the first segment (7) to a position on the tobacco rod (1) adjacent the second segment (3), the tipping paper being attached to and joining the second segment and the tobacco rod.

5. A cigarette according to any preceding claim further comprising a first opening (17,27,33) in the tipping paper (11) and a second opening (19,29,35) in the wrapping (9) positioned such that the first and second openings are movable into varying degrees of registry responsive to movement of the first segment (7) towards the second segment (3), whereby the air dilution of the cigarette is varied.

6. A cigarette according to any one of claims 1, 2, 3 and 4 including a flavour generator (43) disposed in the void (8) and adapted to release varying amounts of a flavourant responsive to movement of the first segment (7) towards the second segment (3).

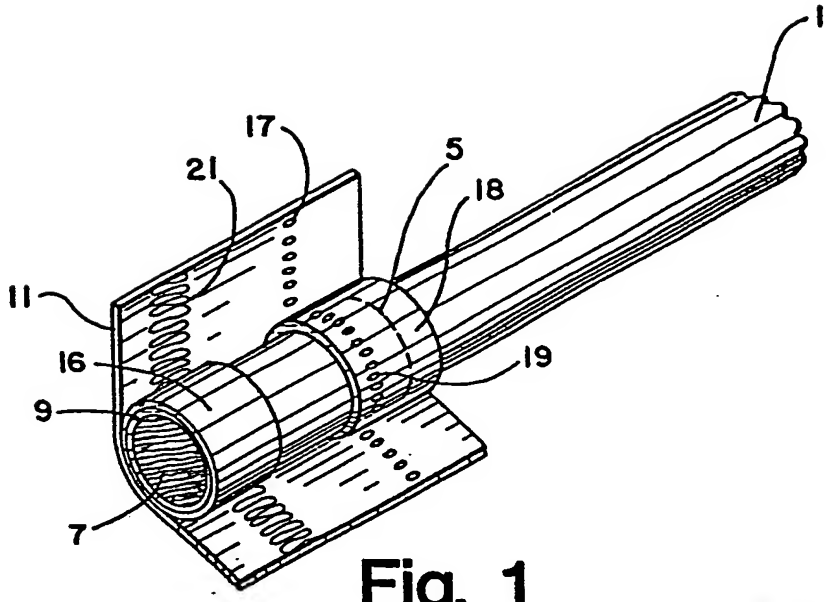

Fig. 1

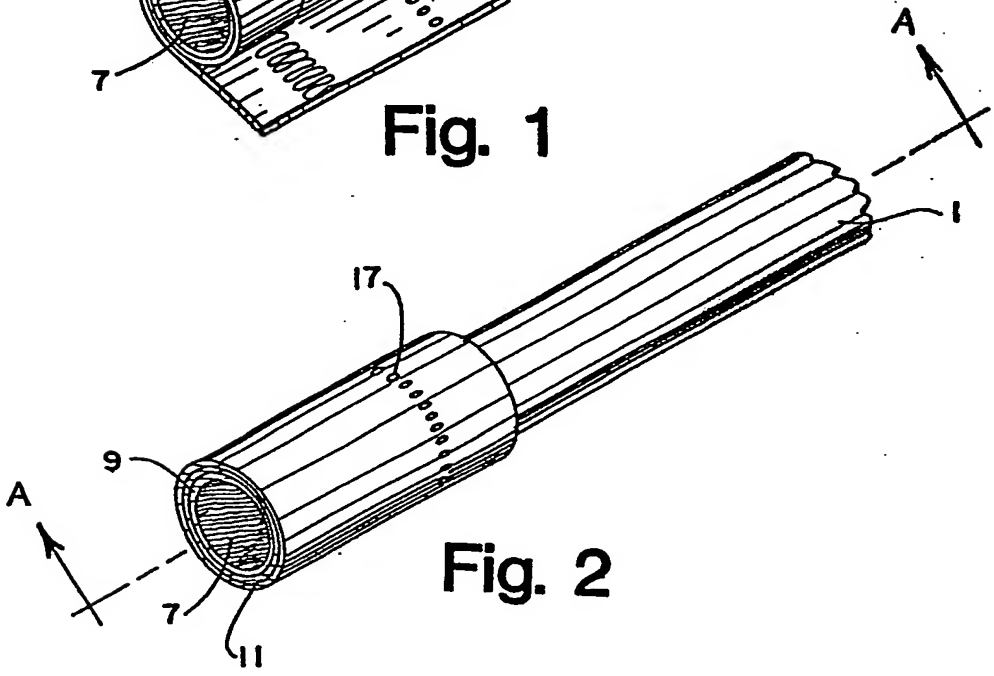

Fig. 2

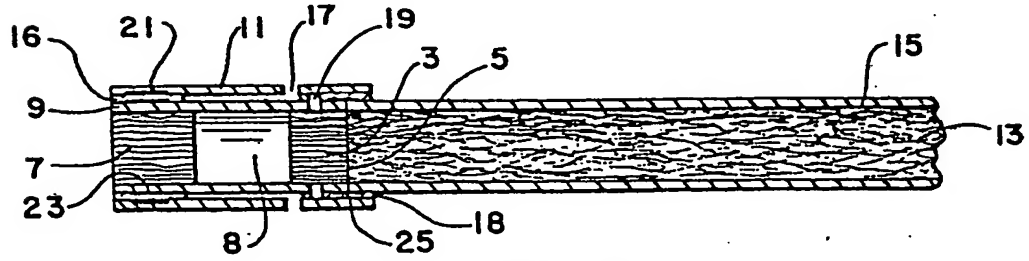

Fig. 3

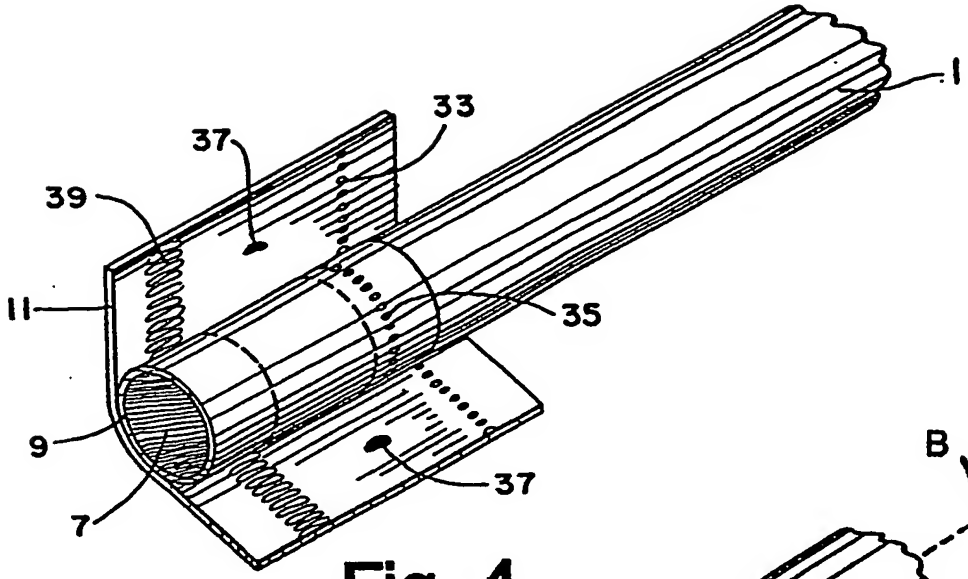

Fig. 4

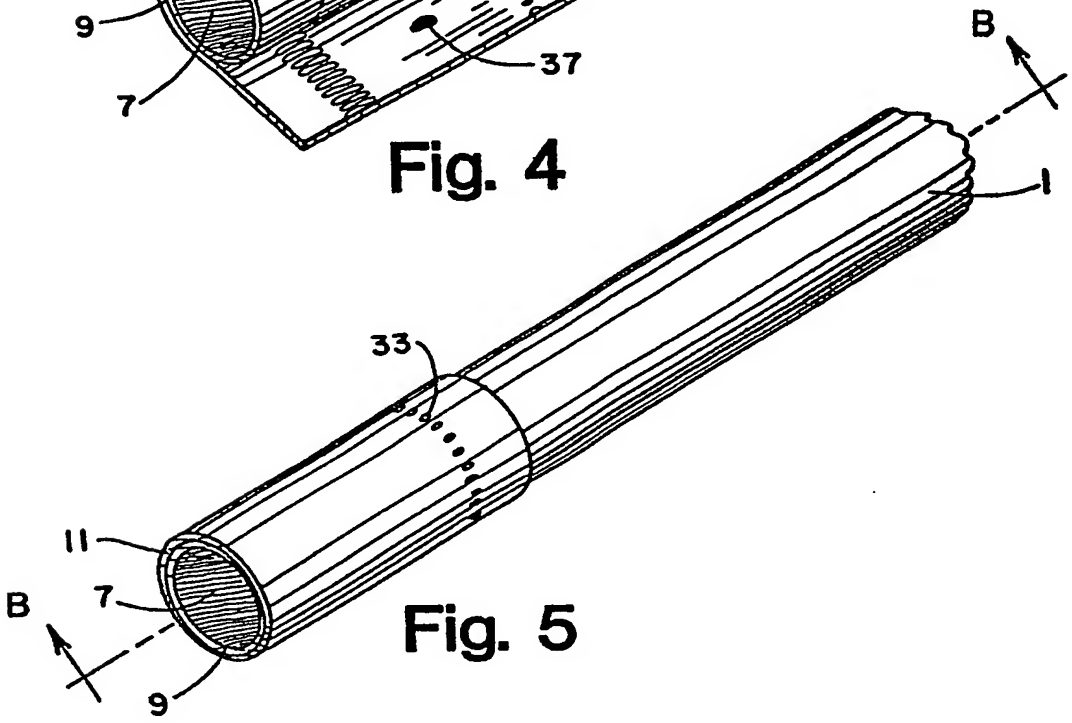

Fig. 5

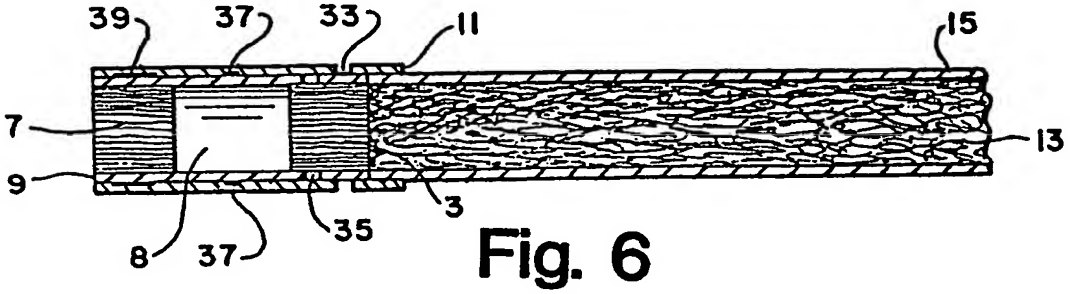

Fig. 6

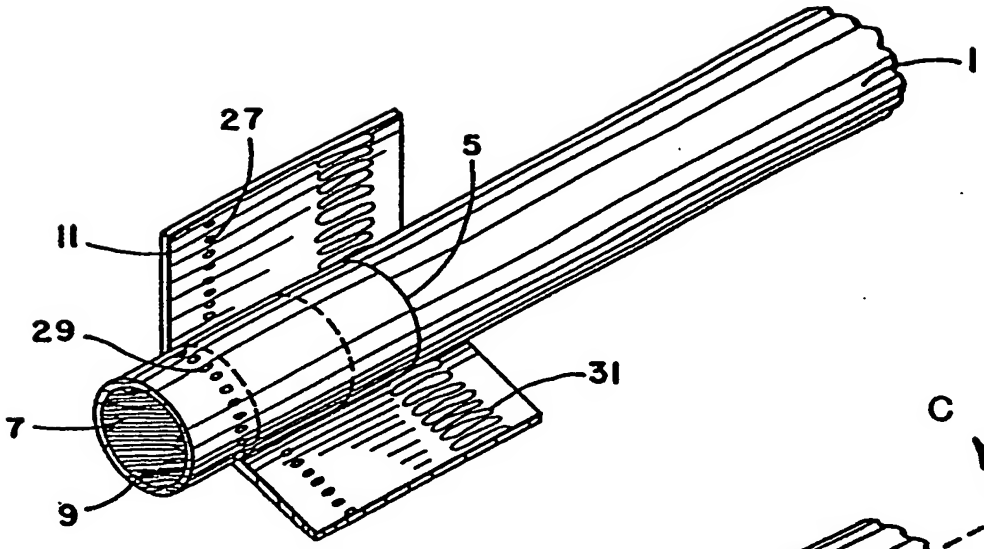

Fig. 7

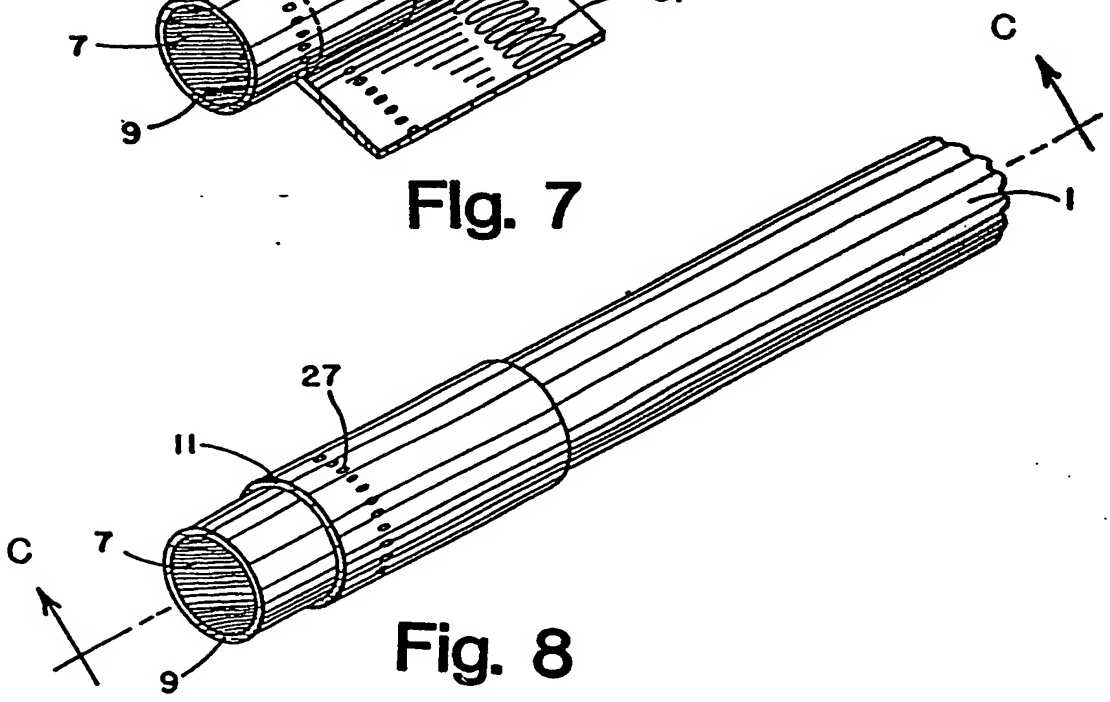

Fig. 8

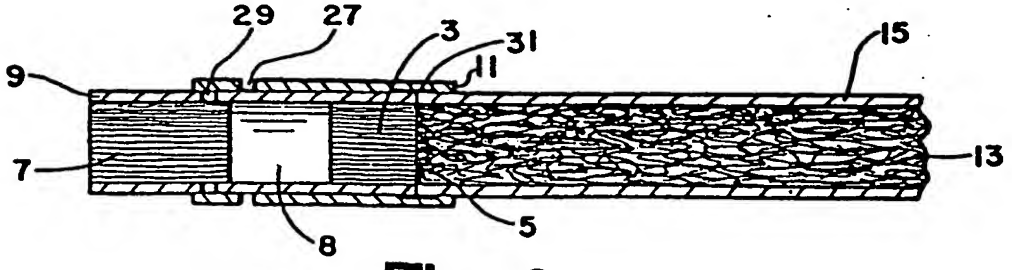

Fig. 9

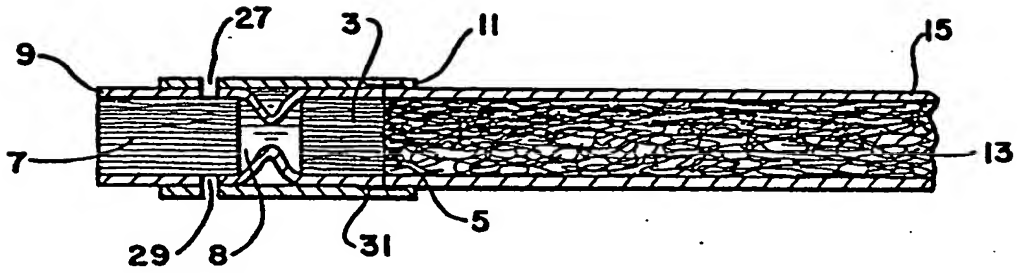

Fig. 10

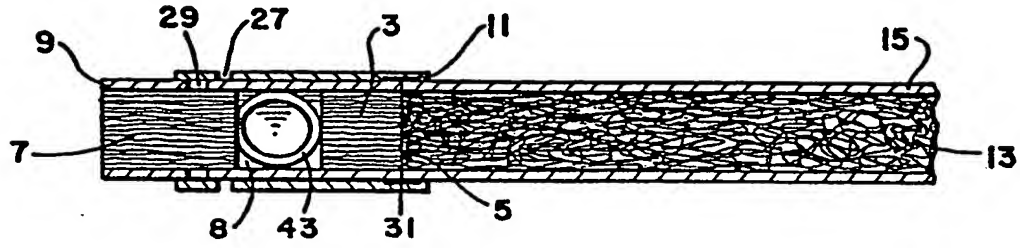

Fig. 11

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Application number

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EUROPEAN SEARCH REPORT

EP 83305689.8

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	FR - A - 2 273 443 (FAHIR) * Claim 1 * --	1-3	A 24 D 1/04 A 24 D 3/04 A 24 D 3/18 A 24 D 3/14
A,P	GB - A - 2 099 678 (JULIUS GLATZ GMBH) * Abstract * --	1-3	
A	GB - A - 1 058 343 (PHILIP MORRIS INCORPORATED) * Page 3, lines 71-97 * --	1-3,6	
A	DE - A - 1 782 545 (MOLINS MACHINE CO. LTD.) * Page 5, line 19 - page 6, line 14 * --	1-3	
A	US - A - 4 201 234 (NEUKOMM) * Abstract * --	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) A 24 D
A	US - A - 3 759 268 (PLOURDE) * Abstract * --	1	
A	US - A - 3 596 665 (LINDGARD) * Column 3, lines 45-55; fig. 3,4 * --	1	
A	US - A - 3 327 718 (KILBURN) * Column 2, lines 26-42 * --	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	23-12-1983	WOLF

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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0105682

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EUROPEAN SEARCH REPORT

Application number

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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	GB - A - 1 095 848 (THE AMERICAN TOBACCO COMPANY) * Claim 1; page 2, lines 72-75 *	1-3,6	TECHNICAL FIELDS SEARCHED (Int. Cl.³)